

800G (4x200G-PAM4) Module Test Data with FECi and FECo

Rang-Chen Yu and Michael He, InnoLight

July 8, 2024



I Supporters

- Ali Ghiasi, Ghiasi Quantum LLC

I Overview

- Goal of this presentation is to show the FECi performance data measured on the actual 4x200G-PAM4 Optical Modules for field deployment and the benefit of FECi- providing additional Link budget margin required by the Network operators for their operational efficiency @ scale.

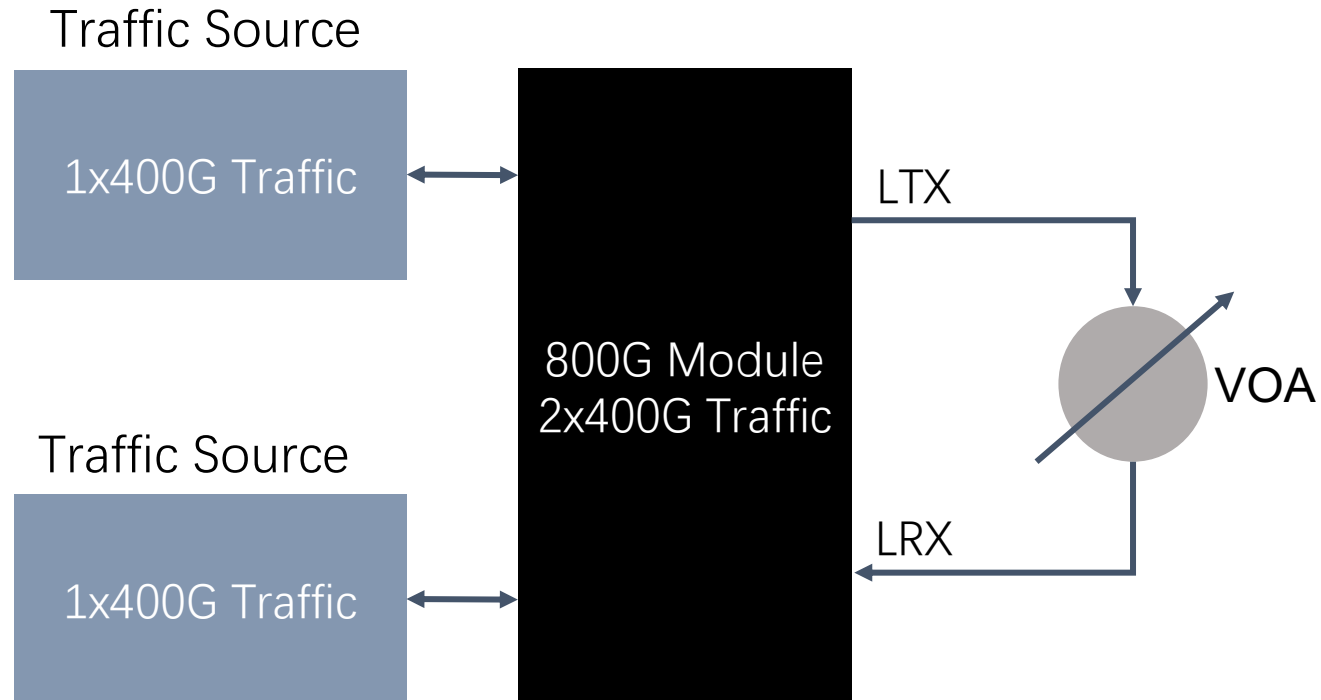
Agenda:

- Mission mode Traffic Data for 800G (4x200G-PAM4) Module
 - Pre-KP4 FEC BER with FECi Vs FECo
- Mission mode KP4 FEC bin statistics:
 - Performance measured over Temperature Ramp conditions over Long run
- Mission mode Stability Test
 - Pre FEC BER and FEC bin variation with FECi over multiple restarts of the Module
- Summary

Mission Mode measurement Set Up

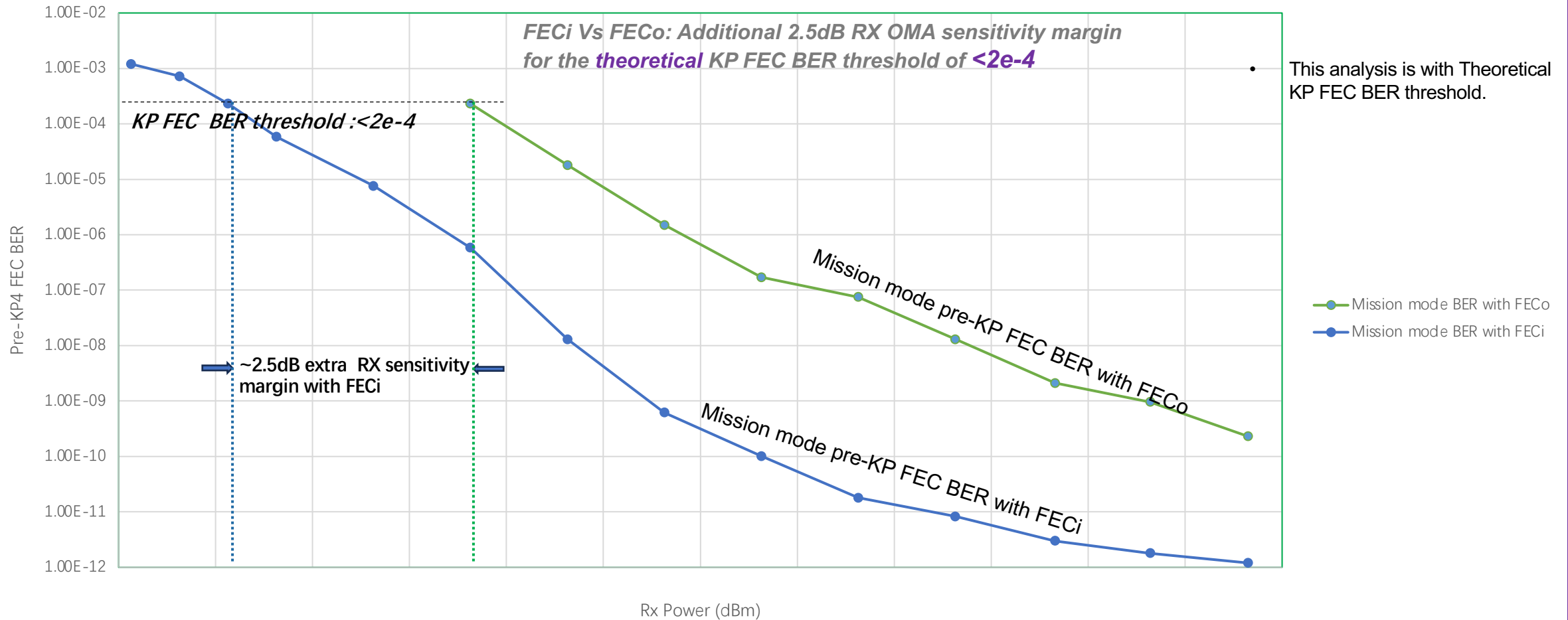
800G Optical Module:

- 4x200G-PAM4 Optics
- DSP retimer can turn on FECi, or turn off FECi for FECo test



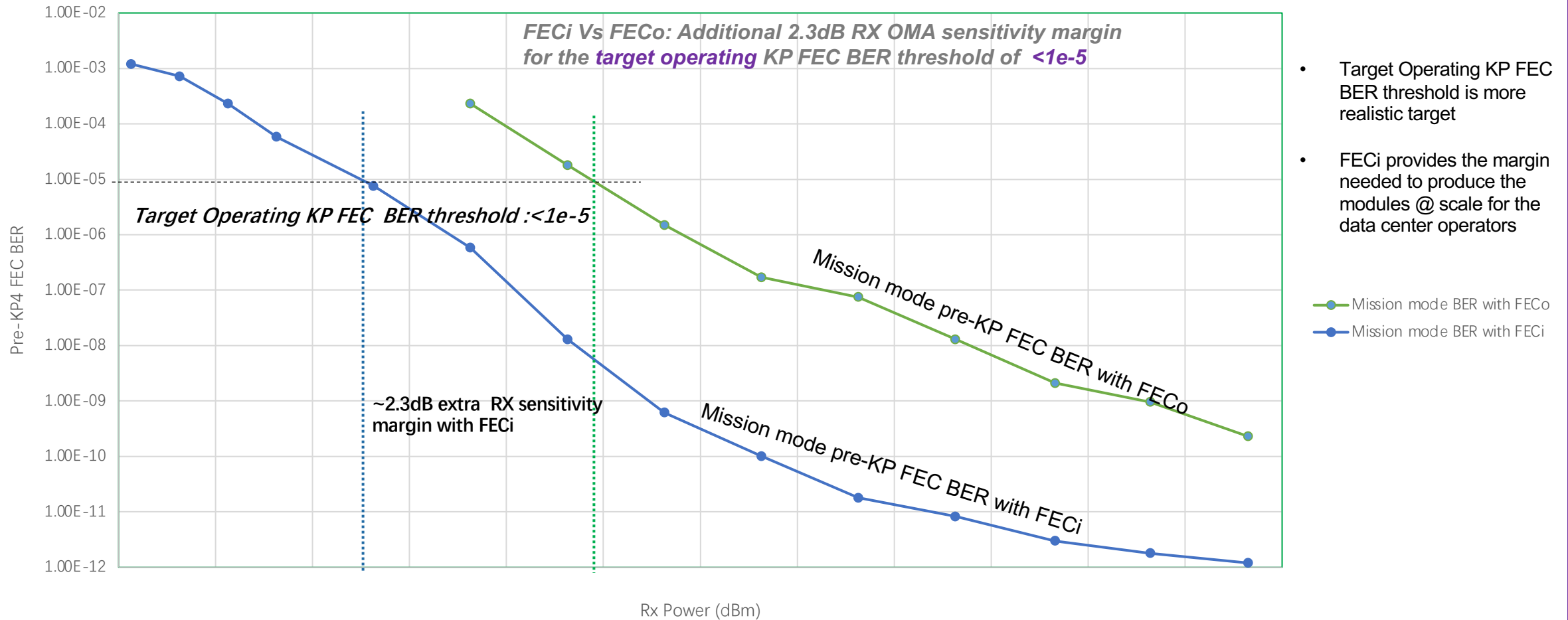
Mission Mode: FECi vs. FECo BER vs. Rx_OMA

Pre-KP4 FEC BER in Mission Mode: FECi Vs FECo

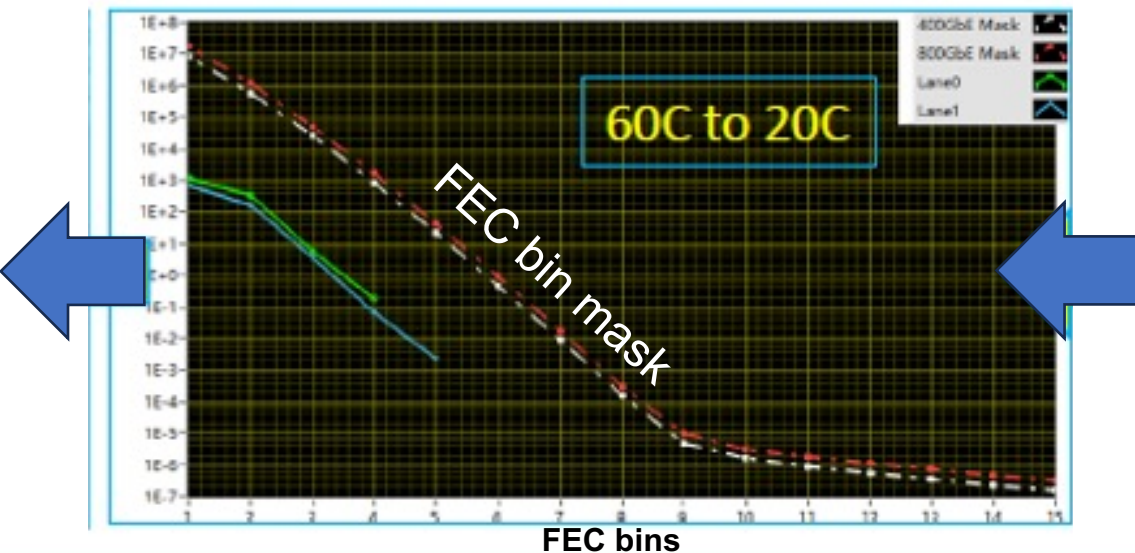
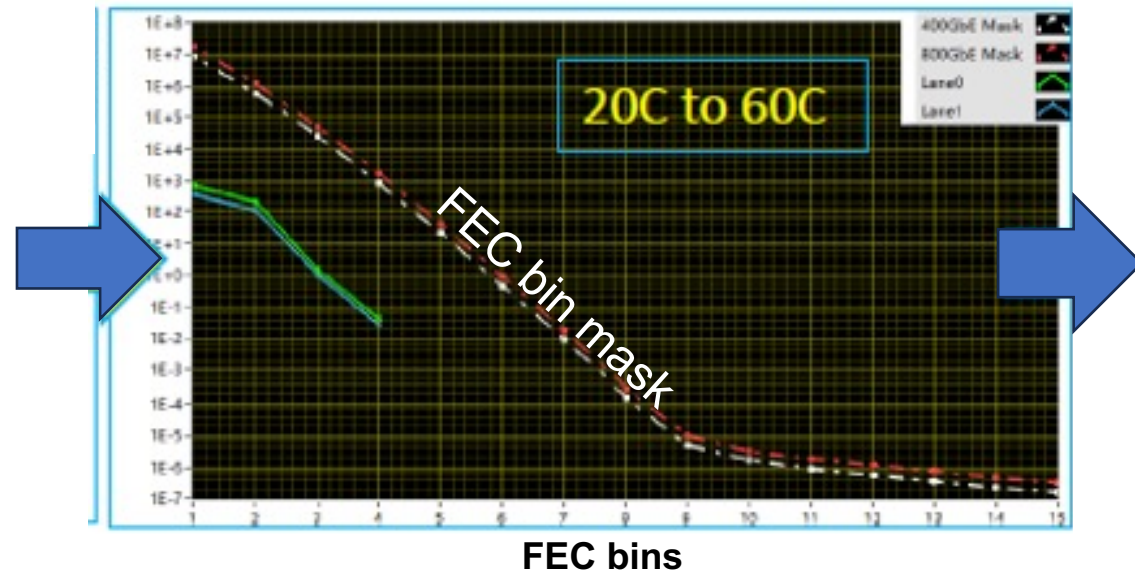


Mission Mode: FECi vs. FECo BER vs. Rx_OMA

Pre-KP4 FEC BER in Mission Mode: FECi Vs FECo



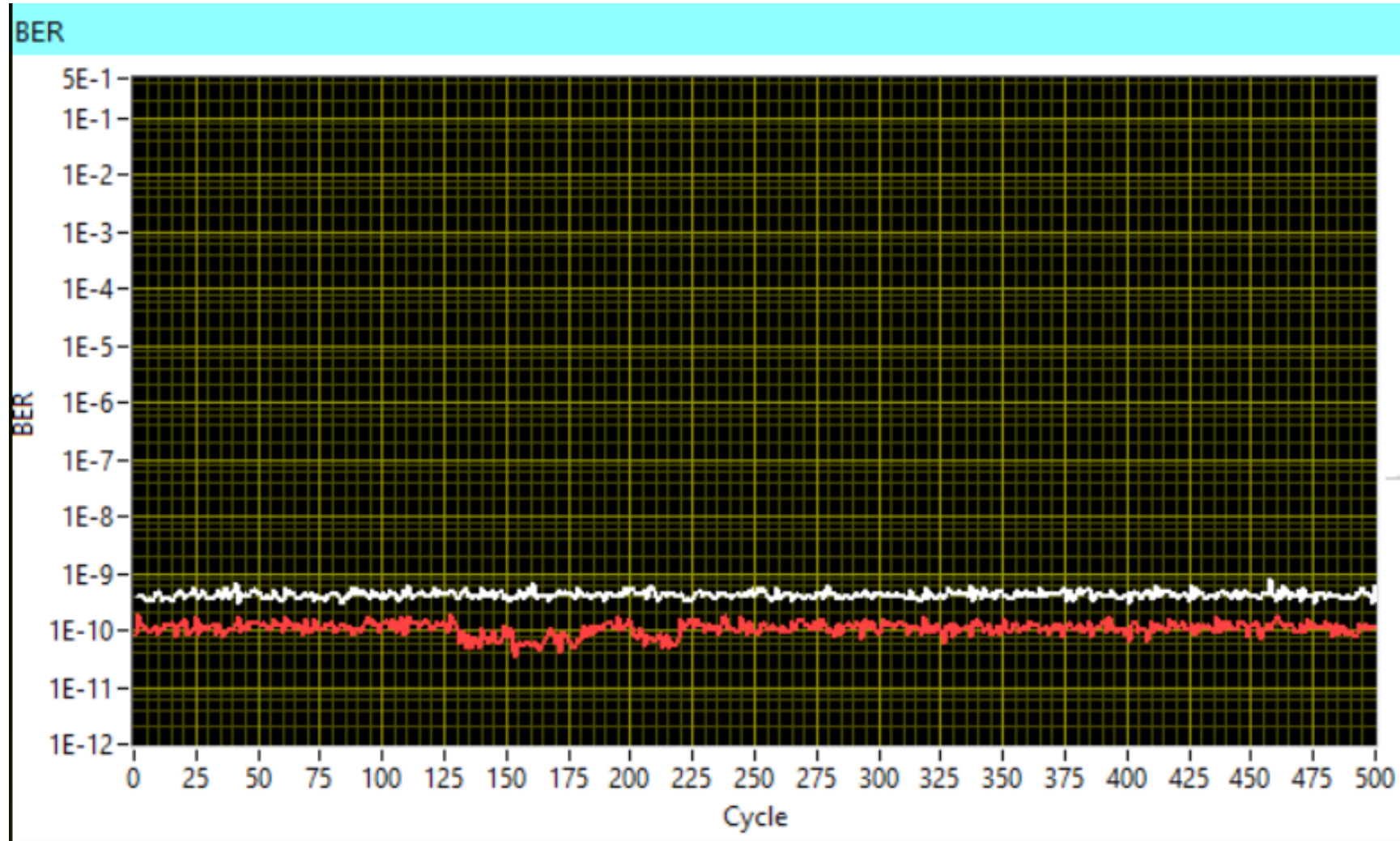
■ KP4 FEC Bin statistics in Mission Mode over Temperature Ramp with FECi



- FEC Bin statistics in Mission mode – Over 24 hours of run over Temperature Ramp condition : 20C to 60C with FECi
- Maximum bin: 4/5 both from Cold to Hot and Hot to Cold Temperature
- Significant margin with respect to FEC bin mask and there is no signature of FEC tail issue with FECi

■ Mission Mode Stability Test Over Multiple module restarts

- 500 re-starts testing on DR4 module
- No Pre-FEC BER variation / No FEC tail jump issue observed



I Summary

- 800G (4x200G-PAM4) transceiver module, used for the data collection for FECi Vs FECo, is one of the actual module – for deployment in the hyperscale data centers.
- FECi mode shows significant Link budget improvement vs. FECo
 - ~2.3 to 2.5 dBm Rx_OMA_sensitivity improvement at same operating conditions
 - Lower BER floor ~ 2 decades
- FECi mode shows the real stable KP4 FEC bin statistics (<5) over 24 hours of run across Temperature ramp conditions (Cold to Hot & Hot to Cold) with no signature of FEC tails.
- Additional Optical Link margin provided by FECi is needed by the network operators for their AI infrastructure for the operational efficiency @ scale.
- As adopted by IEEE - FR4/LR4 requires FECi support for extra link budget



Thank You!

Rangchen.yu@innolight.com